APPENDIX C

SWMP FORMAT AND EXAMPLE

STORM WATER MANAGEMENT PLAN

Permit No. TM 5000

RC Ranch Subdivision

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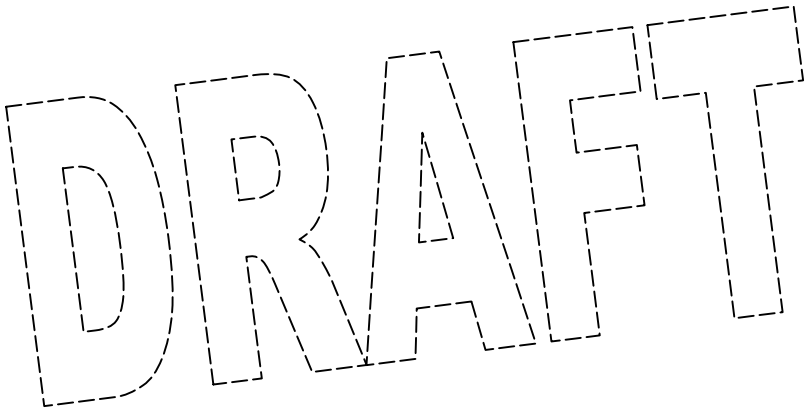

APPENDIX C SWMP FORMAT AND EXAMPLE

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INTRODUCTION

The Stormwater Management Plan (SWMP) requirement is required under the County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (section 67.817). The purpose of this SWMP is to address the water quality impacts from the proposed improvements on the RC Ranch subdivision. Best Management Practices (BMPs) will be utilized to provide a long-term solution to water quality. This SWMP is also intended to ensure the effectiveness of the BMPs through proper maintenance that is based on long-term fiscal planning. The SWMP is subject to revisions as needed by the engineer.

1.0 PROJECT DESCRIPTION

The 50-acre RC Ranch project is located on the south side of San Miguel Road in the County of San Diego (See Attachment 1). The project is approximately 1.0 mile east of the intersection of San Miguel Avenue and San Miguel Road and 1 mile south of the Sweetwater Reservoir. This project will consist of a planned residential community comprising of 45 single-family homes 72 and multi-unit dwellings.

1.1 Topography and Land Use

The project area is characterized by rolling grassy hills and shrubs. Although, the area is designated urban, there are no homes within 1 mile of the project. Currently, the land is undeveloped with San Miguel Creek approximately a quarter mile due south.

1.2 Hydrologic Unit Contribution

The RC Ranch project is located in the Sweetwater watershed and in the La Nacion hydrologic unit (909.12). The project drains southerly towards San Miguel Creek. The storm drain system for this project will discharge to an existing natural channel, which is 0.25 miles upstream from San Miguel Creek. This existing intermittent natural channel is vegetated with native grasses from bank to bank. This channel will only receive stormwater runoff from the project site. The runoff velocities will be reduced to existing value. Overall, the project area represents 0.2 percent of the watershed.

2 WATER QUALITY ENVIRONMENT

2.1 Beneficial Uses

The beneficial uses for the hydrologic unit are included in Tables 1.1 and 1.2. These tables have been extracted from the Water Quality Control Plan for the San Diego Basin.

MUN – Municipal and Domestic Supply: Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
AGR - Agricultural Supply: Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
IND – Industrial Services Supply: Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
REC1 – Contact Recreation: Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not

limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.
REC2 – Non-Contact Recreation: Includes the uses of water for recreational involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
WARM – Warm Freshwater Habitat: Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
WILD – Wildlife Habitat: Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

2.1.1 Inland Surface Waters

Inland Surface waters have the following beneficial uses as shown on table 1.1

Table 1.1 Beneficial Uses for Inland Surface Waters

Hydrologic Unit Number	Mun	Ind	Rec1	Rec2	Warm	Wild
909.12	*	x	0	x	x	x

2.1.2 Groundwater

Groundwater beneficial uses includes agricultural and potentially municipal and industrial.

Tab le 1.2 Beneficial Uses for Groundwater

Hydrologic Unit Number	Mun	Agr	Ind
909.12	x	x	x

*** Excepted from Municipal**

x Existing Beneficial Use
0 Potential Beneficial Use

2.2 303(d) Status

According to the California 1998 303d list published by the San Diego Regional Water Quality Control Board, there are no impaired waterbodies that are associated with this project.

The project location and watersheds have been compared to the current published 303d list of impaired water bodies and the nearest impaired water body is San Diego Bay, impaired by bacteria. San Diego Bay is 6 miles westerly from the project.

3 CHARACTERIZATION OF PROJECT RUNOFF

3.1 Existing and Post-Construction Drainage

The proposed project will not significantly alter drainage patterns on the site. The Stormwater discharge points will not divert runoff from existing conditions. Furthermore, there will not be a substantial increase to the amount of impervious area. Approximately 1.9 acres of open ground will be converted to single-family residential lots and pave an additional 1.2 acres, thus representing a change of 3.8% to the impervious area. This change in land use will increase the composite runoff coefficient, of the project, from C=0.35 to C=0.367. Also, the peak flow rate will increase from 74.6 cfs under the existing condition to 80.4 cfs under the proposed condition.

A detailed description of the drainage patterns and flows are discussed in the Drainage Report submitted to the County of San Diego on January 2002. This section is an excerpt from that report. As discussed in Section 2, the existing condition is undeveloped. The existing natural environment serves as a bio-filter for the runoff generated from the area.

Post-construction runoff will be directed into a storm drain system. This system will not divert water from its natural outlet points. The preliminary design of this system is included in the BMP map. Summaries of the post-construction water quality flows are included in Table 3.1. The flows were developed using the 85th Percentile Precipitation map developed by the County, which was obtained from the website http://www.co.san-diego.ca.us/dpw/land/flood.htm.

Table 3.1 Post-Construction Water Quality Flows

Outfall	Tributary Area (acres)	Q_{100} (cfs)	Q_{WQ} (cfs)
A	7.0	15.3	1.5
B	7.5	20	2.0
C	7.9	19.8	1.8

3.2 Post-Construction Expected Discharges

There are no sampling data available for the existing site condition. In addition, the project is not expected to generate significant amounts of non-visible pollutants. However, the following constituents are commonly found on similar developments and could affect water quality:

- Sediment discharge due to construction activities and post-construction areas left bare.
- Nutrients from fertilizers
- Trash and debris deposited in drain inlets.
- Hydrocarbons from paved areas.
- Pesticides from landscaping and home use.

3.3 Soil Characteristics

The project area consists of soil group C and D with a minimum saturated infiltration rate of 6.3 mm/h. The project will not have slopes steeper than 2:1. All slopes will include slope protection for construction and post-construction.

*(**Note:** Information regarding soil conditions is also available in the Soil Survey, San Diego Area, California, US Department of Agriculture, 1973.)*

4.0 MITIGATION MEASURES TO PROTECT WATER QUALITY

To address water quality for the project, BMPs will be implemented during construction and post-construction.

4.1 Construction BMPs

A detailed description of the construction BMPs will be developed during the Grading Plan and Improvement Plan Engineering. Since the project is in the preliminary development phase only a listing of potential types of temporary BMPs are available. This includes the following:

- Silt Fence
- Fiber Rolls
- Street Sweeping and Vacuuming
- Storm Drain Inlet Protection
- Stockpile Management
- Solid Waste Management
- Stabilized Construction Entrance/Exit
- Dewatering Operations
- Vehicle and Equipment Maintenance
- Erosion Control Mats and Spray-on Applications
- Desilting Basin
- Gravel Bag Berm
- Sandbag Barrier
- Material Delivery and Storage
- Spill Prevention and Control
- Concrete Waste Management
- Water Conservation Practices
- Paving and Grinding Operations
- Permanent Revegetation of All disturbed uncovered areas

Construction BMPs for this project will be selected, constructed, and maintained so as to comply with all applicable ordinances and guidance documents.

4.2 Post-construction BMPs

Pollutants of concern as noted in section 3 will be addressed through three types of BMPs. These types of BMPs are site design, source control and treatment control.

4.2.1 Site Design BMPs

The project is designed to minimize the use of impervious areas. Only 3.8% of the project area will be impervious. Streets have been designed to meet the minimum widths. Landscaping of the slopes and common areas are incorporated into the plans. The landscaping will consist of both native and non-native plants. The goal is to achieve plant establishment expeditiously to reduce erosion. The irrigation system for these landscaped areas will be monitored to reduce over irrigation. Also, riprap will be placed at storm drain outfalls to reduce velocities.

4.2.2 Source Control BMPs

Source control BMPs will consist of measures to prevent polluted runoff. This program will include an educational component directed at each homeowner. The homeowners will receive a set of brochures developed by the County's Environmental Health Department. These will include the following:

- Stormwater Runoff Pollution Fact Sheet;
- Stormwater Runoff Pollution Prevention Tips for Homeowners;
- Stormwater Pollution Prevention Yard Work (Landscaping, Gardening, Pest Control);
- Stormwater Pollution Prevention Pet Waste; and
- Stormwater BMP Swimming Pool and Spa Cleaning.

In addition, storm drain inlets will be stenciled with a message warning citizens not to dump pollutants into the drains.

4.2.3 Treatment Control BMPs

The following treatment control BMPs will be implemented to address water quality:

- Extended Detention Basins
- Bio-Filters
- Continuous Deflective Separation® Units

Placements of the BMPs are noted on the project plan (Attachment C).

4.2.3.1 Extended Detention Basins

Detention devices are impoundments where the water quality volume is temporarily detained under quiescent conditions, allowing sediment and particulates to settle out. A conceptual schematic of a detention basin is shown in Figure 3.2.1.

Detention devices remove litter, settleable solids (debris), and total suspended solids (TSS). Pollutants, such as heavy metals, that are attached (adsorbed) to the settled particulate matter will also be removed.

4.2.3.1.1 Appropriate Applications and Siting Constraints

Detention devices should be considered for implementation wherever site conditions allow.

One important siting requirement is that sufficient head is available so that water stored in the device does not cause a backwater condition in the storm drain system, which would limit its capacity. A second siting requirement is that seasonally high groundwater is no higher than the bottom elevation of the device for reasons described below.

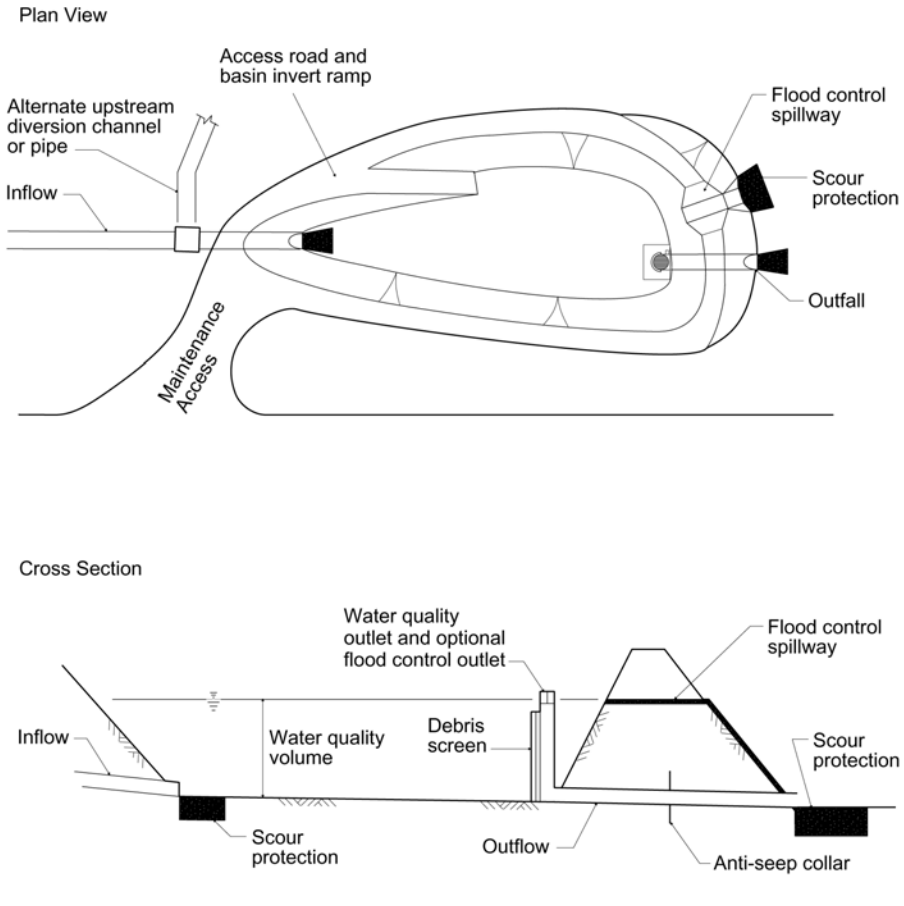

Figure3.2.1
Example of Extended Detention Basin Schematic
(Not a Standard Plan)

FACTORS AFFECTING PRELIMINARY DESIGN:

Detention devices should be designed to hold at least the 24-hour water quality volume. The maximum water level in the detention device should not cause groundwater to occur under the roadway within 0.2 m (8 inches) of the roadway subgrade. A flow-path-to-width ratio of at least 2:1 is recommended. Baffles or interior berms to accommodate the geometry of the site can accomplish this ratio.

Liners are not generally required for detention basins. Infiltration is permissible if the infiltrated water does not surface in an undesirable place off-site or threaten the stability of a slope or embankment down gradient of the basin. To protect groundwater quality and to ensure dry conditions for maintenance of unlined basins, the distance between the basin invert and seasonally high groundwater should be at least 2 m (6 ft). Where the groundwater is higher than this, the basin should be provided with an impermeable liner. In no case should the seasonally high groundwater be higher than the bottom elevation of the detention device to prevent uplift of tanks or liners.

Discharge should be accomplished through a water quality outlet. An example is shown in Figure 3.2.2. A rock pile or rock-filled gabions can serve as alternatives to the debris screen. The water quality outlet should be designed to empty the device within 24 to 72 hours. (The 24-hour limit is chosen to provide adequate settling time; the 72-hour limit is chosen to minimize the potential for mosquito breeding.) Because detention basins are not maintained for infiltration, water loss by infiltration should be disregarded when designing the hydraulic capacity of the outlet structure.

Public health and vector control authorities should be consulted to verify the acceptability of detention basins and the maximum drawdown time allowed to avoid mosquito problems.

The inlet structure of the basin should be designed to divert the peak hydraulic flow (calculated according to County procedures for flood routing and scour) when the basin is full. Alternatively, an overflow structure sized according to these criteria can be provided in one of the downstream walls or berms. A third alternative is to include a flood control outlet in the top of the water quality outlet. In this case, an additional outlet (riser or spillway) should be supplied to prevent overtopping of the walls or berms. Entering flows should be distributed uniformly at low velocity to prevent re-suspension of settled materials and to encourage quiescent conditions.

The site must have sufficient area for a perimeter maintenance road and safe access to and from the site from local roads. Basin side slopes must be shallow enough to permit tracked vehicles to access the basin bottom for maintenance. Alternatively, an access ramp should be provided. Preliminary design factors for detention basins are summarized in Table 3.2.1.

Table 3.2.1 Summary Of Extended Detention Basin Design Factors

Description	Applications/Siting	Preliminary Design Factors
Impoundments where the water quality volume is temporarily detained Treatment Mechanisms: • Sedimentation • Infiltration (if basin unlined) Pollutants removed: • Sediment and particulates • Litter • Sorbed pollutants (heavy metals, O&G)	• Sufficient head to prevent backwater condition in the storm drain system • Seasonally high groundwater below basin invert • Consult public health and vector control authorities	• Size to capture the 24-hr water quality volume • Flow-path-to-width ratio of at least 2:1 recommended • Maximum water level should not cause groundwater to occur under the roadway within 0.2 m of the roadway subgrade • Basin invert ≥ 2 m above seasonally high groundwater or else a impermeable liner is required • Scour protection on inflow, outfall and spillway • Maintenance access (road around basin and ramp to basin invert) • Upstream diversion channel or pipe, downstream overflow structure or flood control outlet • Discharge through a water quality outlet with debris screen (or equivalent) • Outlet design to empty basin within 24 to 72 hrs • Flows should enter at low velocity

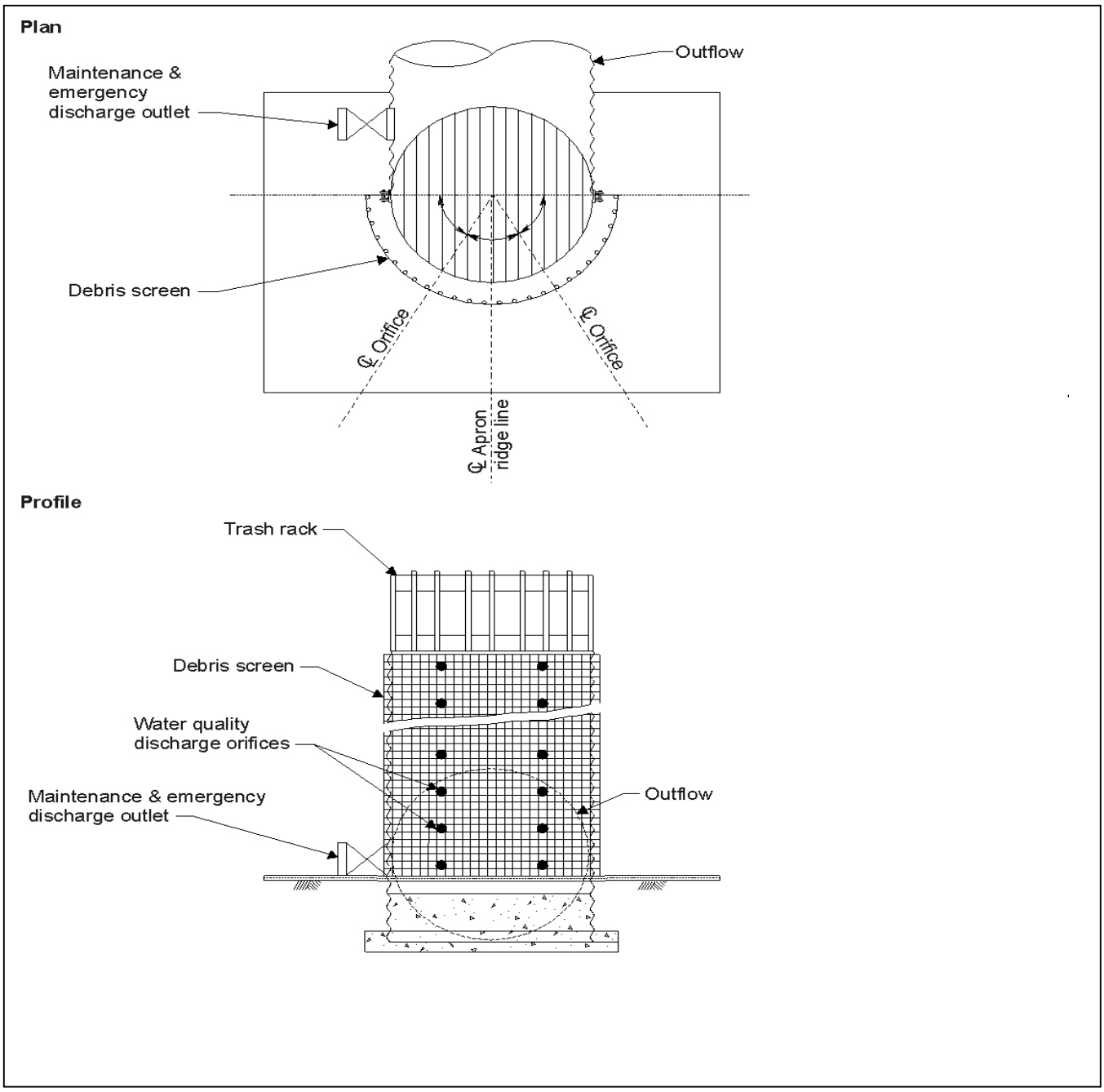

Figure 3.2.2
Detention Basin Outlet Structure Schematic
(Not a Standard Plan)

4.2.3.2 Bio-Filters

Bio-filtration swales are vegetated channels that receive directed flow and convey storm water. Bio-filtration strips, also known as vegetated buffer strips, are vegetated sections of land over

which storm water flows as overland sheet flow. A schematic illustration of bio-filter is shown in Figure 3.3.1.

Pollutants are removed by filtration through the grass, sedimentation, adsorption to soil particles, and infiltration through the soil. Swales and strips are mainly effective at removing debris and solid particles, although some dissolved constituents are removed by adsorption onto the soil.

4.2.3.2.1 Appropriate Applications and Siting Constraints:

Swales and strips should be considered wherever site conditions and climate allow vegetation to be established and where flow velocities are not high enough to cause scour. Even where strips cannot be sited to accept directed sheet flow, vegetated areas provide treatment of rainfall and reduce the overall impervious surface.

FACTORS AFFECTING PRELIMINARY DESIGN:

Swales have two design goals: 1) maximize treatment, 2) provide adequate hydraulic function for flood routing, adequate drainage and scour prevention. Treatment is maximized by designing the flow of water through the swale to be as shallow and long as site constraints allow. No minimum dimensions are required for treatment purposes, as this could exclude swales from consideration at some sites. Swales should also be sized as a conveyance system calculated according to County procedures for flood routing and scour.

To maximize treatment efficiency, strips should be designed to be as long (in the direction of flow) and as flat as the site will allow. No minimum lengths or maximum slopes are required for treatment purposes. The area to be used for the strip should be free of gullies or rills that can concentrate overland flow and cause erosion.

Vegetation mixes appropriate for various climates and locations will be developed by District landscape staff. Table 3.3.1 summarizes preliminary design factors for bio-filtration.

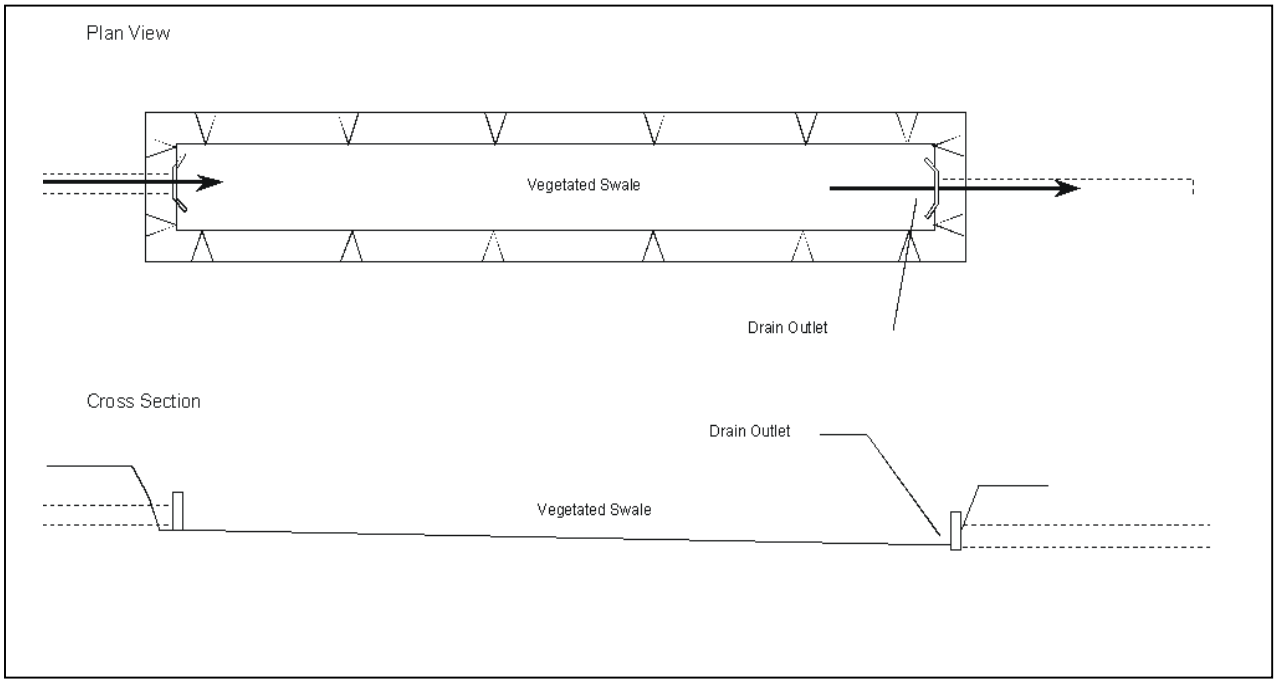

Figure 3.3.1
Example of Bio-filter Schematic

Table 3.3.1: Summary Of Bio-filtration Design Factors (Strips And Swales)

Description	Applications/Siting	Preliminary Design Factors
Swales are vegetated channels that receive and convey storm water. Strips are vegetated buffer strips over which storm water flows as sheet flow. Treatment Mechanisms: • Filtration through the grass • Sedimentation • Adsorption to soil particles • Infiltration Pollutants removed: • Debris and solid particles • Some dissolved constituents	• Site conditions and climate allow vegetation to be established • • Flow velocities not high enough to cause scour	• Swales sized as a conveyance system (per County flood routing and scour procedures) • Swales sized as a conveyance system (per County flood routing and scour procedures) • Swale water depth as shallow as the site will permit • Strips sized as long (in direction of flow) and flat as the site allows • Strips should be free of gullies or rills • No minimum dimensions or slope restrictions for treatment purposes • Vegetation mix appropriate for climates and location

4.2.3.3 Continuous Deflective Separation® Units

The CDS Technology was developed as a gross pollutant trap and is a proprietary product manufactured under patents by CDS Technologies, Inc. The technology captures and retains floatables, trash and debris greater than 0.05 inch in stormwater runoff, as well as capture of fine sand and larger particles and the pollutants attached to those particles. The CDS unit is a non-mechanical self-operating system and will function when there is flow in the storm drainage system. A cross-section of a CDS unit is shown in Figure 3.3.1. The unit is designed to capture pollutants in flows up to the design capacity and during extreme rainfall events when the designed capacity may be exceeded. Material captured in the CDS unit's separation chamber and sump is retained even when the unit's design capacity is exceeded.

4.2.3.3.1 Appropriate Applications and Siting Constraints:

CDS should be considered for implementation wherever site conditions allow.

One important siting requirement is that sufficient head is available so that water stored in the device does not cause a backwater condition in the storm drain system, which would limit its capacity.

5.0 OPERATION AND MAINTENANCE PROGRAM

The operation and maintenance requirements for each type of BMP is as follows:

5.1 Extended Detention Basin

The operational and maintenance needs of an EDB are:

- Dispersion of alluvial sediment deposition at inlet structures thus limiting the extended localized ponding of water
- Periodic sediment removal in accordance with the 18" depth threshold or 10% of the storage volume (which ever is less).
- Monitoring of the basin to ensure it is completely and properly drained.
- Outlet riser cleaning. Vegetation management to prevent marsh vegetation from taking hold, and to limit habitat for disease-carrying fauna.
- Removal of graffiti, grass trimmings, weeds, tree pruning, leaves, litter, and debris.
- Preventative maintenance on monitoring equipment.
- Vegetative stabilization of eroding banks and basal areas.

Inspection Frequency

The facility will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance

Functional maintenance is important for performance and safety reasons. Aesthetic maintenance is important for public acceptance of stormwater facilities.

Aesthetic Maintenance

The following activities will be included in the aesthetic maintenance program:

- Graffiti Removal. Graffiti will be removed in a timely manner to improve the appearance of an EDB, and to discourage additional graffiti or other acts of vandalism.
- Grass Trimming. Trimming of grass will be done around fences, the basin, outlet structures, and sampling structures.
- Weed Control. Weeds will be removed through mechanical means.

Functional Maintenance

Functional maintenance has two components:
Preventive maintenance.
Corrective maintenance.

Preventive Maintenance

Preventive maintenance that will be done on a regular basis. Preventive maintenance activities to be instituted at an EDB are:

- Mowing. Vegetation in the EDB will be kept at the average maximum height of 18 inches to prevent the establishment of marsh vegetation, the stagnation of water, and the development of faunal habitats.
- Trash and Debris. During each inspection and maintenance visit to the site, debris and trash removal will be conducted to reduce the potential for inlet and outlet structures and other components from becoming clogged and inoperable during storm events.
- Sediment Management. Alluvial deposits at the inlet structures may create zones of ponded water. Upon these occurrences these deposits will be graded within the EDB in an effort to maintain the functionality of the BMP. Sediment grading will be accomplished by manually raking the deposits.
- Sediment Removal. Surface sediments will be removed when sediment accumulation is greater than 18-inches, or 10 percent of the basin volume, whichever is less. Vegetation removed with any surface sediment excavation activities will be replaced through reseeding. Disposal of sediments will comply with applicable local, county, state, or federal requirements.
- Mechanical Components. Regularly scheduled maintenance will be performed on valves, fence gates, locks, and access hatches in accordance with the manufacturers' recommendations. Mechanical components will be operated during each maintenance inspection to assure continued performance.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of an EDB. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which threaten the ability of an EDB to store or convey water, will be removed immediately and properly disposed of.
- Structural Repairs. Repairs to any structural component of an EDB will be made promptly (e.g., within 10 working days). Designers and contractors will conduct repairs where structural damage has occurred.
- Embankment and Slope Repairs. Damage to the embankments and slopes will be repaired quickly (e.g., within 10 working days).
- Erosion Repair. Where a reseeding program has been ineffective, or where other factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of an EDB. There are a number of corrective actions than can be taken. These include erosion control blankets, riprap, sodding, or reduced flow through the area. Design engineers will be consulted to address erosion problems if the solution is not evident.
- Fence Repair. Timely repair of fences (e.g., within 10 working days) will be done to maintain the security of the site.
- Elimination of Trees and Woody Vegetation. Woody vegetation will be removed from embankments.
- Elimination of Animal Burrows. Animal burrows will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated.
- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Maintenance Frequency
The maintenance indicator document, included as Appendix B, lists the schedule of maintenance activities to be implemented at a pilot EDB.

Debris and Sediment Disposal
RC Ranch is responsible for any hazardous waste generated at an EDB since they are responsible for maintenance. Disposal of sediment, debris, and trash will be contracted out in accordance with local, county, state, and federal waste control programs. Table 3.1.2.1 shows a few possible disposal services for waste material.

Hazardous Wastes
Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous materials generated on site will be handled and disposed of according to local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the California Code of Federal Regulations, Title 22, Article 11 (State of California, 1985).

5.2 Bio-Filters

The operational and maintenance needs of a Swale are:

- Vegetation management to maintain adequate hydraulic functioning and to limit habitat for disease-carrying animals.
- Animal and vector control.
- Periodic sediment removal to optimize performance.
- Trash, debris, grass trimmings, tree pruning, and leaf collection and removal to prevent obstruction of a Swale and monitoring equipment.
- Removal of standing water, which may contribute to the development of aquatic plant communities or mosquito breeding areas.
- Removal of graffiti.
- Preventive maintenance on sampling, flow measurement, and associated BMP equipment and structures.
- Erosion and structural maintenance to prevent the loss of soil and maintain the performance of the Swale.

Inspection Frequency

The facility will be inspected and inspection visits will be completely documented:
- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance
Aesthetic maintenance is important for public acceptance of stormwater facilities. Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance
The following activities will be included in the aesthetic maintenance program:

- Graffiti Removal. Graffiti will be removed in a timely manner to improve the appearance of a Swale and to discourage additional graffiti or other acts of vandalism.
- Grass Trimming. Trimming of grass will be done on the Swale, around fences, at the inlet and outlet structures, and sampling structures.
- Weed Control. Weeds will be removed through mechanical means. Herbicide will not be used because these chemicals may impact the water quality monitoring.

Functional Maintenance

Functional maintenance has two components:

Preventive maintenance
Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted at a Swale are:

- Grass Mowing. Vegetation seed mix within the Swale is designed to be kept short to maintain adequate hydraulic functioning and to limit the development of faunal habitats.
- Trash and Debris. During each inspection and maintenance visit to the site, debris and trash removal will be conducted to reduce the potential for inlet and outlet structures and other components from becoming clogged and inoperable during storm events.
- Sediment Removal. Sediment accumulation, as part of the operation and maintenance program at a Swale, will be monitored once a month during the dry season, after every large storm (0.50 inch), and monthly during the wet season. Specifically, if sediment reaches a level at or near plant height, or could interfere with flow or operation, the sediment will be removed. If accumulation of debris or sediment is determined to be the cause of decline in design performance, prompt action (i.e., within ten working days) will be taken to restore the Swale to design performance standards. Actions will include using additional fill and vegetation and/or removing accumulated sediment to correct channeling or ponding. Characterization and Appropriate disposal of sediment will comply with applicable local, county, state, or federal requirements. The swale will be regraded, if the flow gradient has changed, and then replanted with sod.
- Removal of Standing Water. Standing water must be removed if it contributes to the development of aquatic plant communities or mosquito breeding areas.
- Mechanical and Electronic Components. Regularly scheduled maintenance will be performed on fences, gates, locks, and sampling and monitoring equipment in accordance with the manufacturers' recommendations. Electronic and mechanical components will be operated during each maintenance inspection to assure continued performance.
- Fertilization and Irrigation. The vegetation seed mix has been designed so that fertilization and irrigation is not necessary. Fertilizers and irrigation will not be used to maintain the vegetation.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of a Swale. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which impede the hydraulic functioning of a Swale and prevent vegetative growth, will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made. Vegetation will be re-established after sediment removal.
- Structural Repairs. Once deemed necessary, repairs to structural components of a Swale and its inlet and outlet structures will be done within 10 working days. Qualified individuals (i.e., the designers or contractors) will conduct repairs where structural damage has occurred.
- Embankment and Slope Repairs. Once deemed necessary, damage to the embankments and slopes of Swales will be repaired within 10 working days).
- Erosion Repair. Where a reseeding program has been ineffective, or where other factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of a Swale. There are a number of corrective actions than can be taken. These include erosion control blankets, riprap, sodding, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.
- Fence Repair. Repair of fences will be done within 30 days to maintain the security of the site.
- Elimination of Animal Burrows. Animal burrows will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated. If the BMP performance is affected, abatement will begin. Otherwise, abatement will be performed annually in September.
- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Maintenance Frequency

The maintenance indicator document, included as Appendix B, lists the schedule of maintenance activities to be implemented at a Swale.

Debris and Sediment Disposal

Waste generated at Swales is ultimately the responsibility of RC Ranch. Disposal of sediment, debris, and trash will comply with applicable local, county, state, and federal waste control programs. Table 3.1.2.1 shows a few possible disposal services for waste material.

Hazardous Waste
Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

5.3 Continuous Deflective Separation® Units

The operational and maintenance needs of a CDS are:

- Inspection of its structural integrity and its screen for damage.
- Animal and vector control.
- Periodic sediment removal to optimize performance.
- Scheduled trash, debris and sediment removal to prevent obstruction.
- Removal of graffiti.
- Preventive maintenance of BMP equipment and structures.
- Erosion and structural maintenance to maintain the performance of the CDS.

Inspection Frequency

The facility will be inspected and inspection visits will be completely documented:
- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance
Aesthetic maintenance is important for public acceptance of stormwater facilities. Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance
The following activities will be included in the aesthetic maintenance program:

Graffiti Removal. Graffiti will be removed in a timely manner to improve the appearance of a CDS and to discourage additional graffiti or other acts of vandalism.

Functional Maintenance

Functional maintenance has two components:
Preventive maintenance
Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted at a CDS are:

- Trash and Debris Removal. Trash and Debris accumulation, as part of the operation and maintenance program at a CDS, will be monitor once a month during dry and wet season and after every large storm event. Trash and debris will be removed from the CDS unit annually (at end of wet season), or when material is at 85% of CDS' sump capacity, or when the floating debris is 12 inches deep, whichever occurs first.
- Sediment Removal. Sediment accumulation, as part of the operation and maintenance program at a CDS, will be monitored once a month during the dry season, after every large storm (0.50 inch). Sediment will be removed from the CDS annually (at end of wet season), or when material is at 85% of CDS' sump capacity, or when the floating debris is 12 inches deep, whichever occurs first. Characterization and disposal of sediment will comply with applicable local, county, state or federal requirements.
- Mechanical and Electronic Components. Regularly scheduled maintenance will be performed on fences, gates, locks, and sampling and monitoring equipment in accordance with the manufacturers' recommendations. Electronic and mechanical components will be operated during each maintenance inspection to assure continued performance.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of a CDS. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which impede the hydraulic functioning of a CDS will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made.
- Structural Repairs. Once deemed necessary, repairs to structural components of a CDS and its inlet and outlet structures will be done within 30 working days. Qualified individuals (i.e., the manufacturer representatives) will conduct repairs where structural damage has occurred.
- Erosion Repair. Where factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of a CDS. There are a number of corrective actions than can be taken. These include erosion control blankets, riprap, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.
- Fence Repair. Repair of fences will be done within 30 days to maintain the security of the site.
- Elimination of Animal Burrows. Animal burrows will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and

compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated. If the BMP performance is affected, abatement will begin. Otherwise, abatement will be performed annually in September.

- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Maintenance Frequency
The maintenance indicator document, included as Appendix B, lists the schedule of maintenance activities to be implemented at a CDS.

Debris and Sediment Disposal
Waste generated at a CDS is ultimately the responsibility of RC Ranch. Disposal of sediment, debris, and trash will comply with applicable local, county, state, and federal waste control programs. Table 3.1.2.1 shows a few possible disposal services for waste material.

Hazardous Waste
Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria list in the CCR, Title 22, Article 11.

6.0 FISCAL RESOURCES

This section is intended to provide information regarding the ability of the owner/developer to ensure the construction and maintenance of post-construction BMPs [sec. G.7.2, Stormwater Standards Manual, Ordinance 9426.].

*(**Note:** The County is developing categorical guidance for long-term BMP maintenance and resourcing. This guidance provides options and maintenance categories that can be used to complete this section. This guidance will be presented to the Board of Supervisors in June 2002, for approval. A draft of this guidance is available at www.sdcdpw.org)*

7.0 SUMMARY/CONCLUSIONS

This SWMP has been prepared in accordance with the Watershed Protection, Stormwater Management, and Discharge Control Ordinance and the Stormwater Standards Manual. This SWMP has evaluated and addressed the potential pollutants associated with this project and their effects on water quality. A summary of the facts and findings associated with this project and the measures addressed by this SWMP is as follows:

- The beneficial uses for the receiving waters have been identified. None of these beneficial uses will be impaired or diminish due to the construction and operation of this project.

APPENDIX C SWMP FORMAT AND EXAMPLE

- The RC Ranch project will not significantly alter drainage patterns on the site. The discharge points will not be changed and riprap energy dissipaters will be placed to attenuate the flow velocities. Thus preventing downstream erosion.
- Only 3.8% of the total project area will be impervious. Open areas and slopes will be landscaped to reduce or eliminate sediment discharge.
- The vegetated swales and extended detention basins proposed as part of the project will provide some mitigation of the increased peak flows by detaining flows, reducing the velocities, and providing opportunities for infiltration.
- The proposed construction and post-construction BMPs address mitigation measures to protect water quality and protection of water quality objectives and beneficial uses to the maximum extent practicable.

APPENDIX C SWMP FORMAT AND EXAMPLE

This Stormwater Management Plan has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

JOHN C. ENGINEER
REGISTERED CIVIL ENGINEER

DATE

ATTACHMENT A

LOCATION MAP

ATTACHMENT B

PROJECT MAP

ATTACHMENT C

BMP MAP

*(**NOTE:** INDICATE SITE DESIGN AND SOURCE CONTROL BMPS TO EXTENT POSSIBLE, IN ADDITION TO TREATMENT CONTROL BMPS)*

ATTACHMENT D

BMP DATASHEETS